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AN ECOLOGICAL SURVEY OF THE PROPOSED SPECIMEN CREEK RESEARCH NATURAL AREA, SISKIYOU CO., CALIFORNIA[1]

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by

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1. Report to Region 5/PSW Research Natural Area Committee, U.S. Forest Service.

AN ECOLOGICAL SURVEY OF THE PROPOSED SPECIMEN CREEK RESEARCH NATURAL AREA, SISKIYOU CO., CALIFORNIA

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The proposed Specimen Creek Research Natural Area is located in the Sawyers Bar Ranger District of the Klamath National Forest. The area of about 600 acres is composed of west and southwest-facing slopes on a ridge bounded to the west by the Little North Fork of the Salmon River, to the south by the North Fork of the Salmon River, to the east by Kelly Gulch, and to the north by a small tributary of Specimen Creek. This roughly corresponds to Sections 12 and 13, T40N, R12W, and Section 7, T40N, R13W (Fig. 1).

Topographically, the area ranges from alluvial terraces through low slopes to steep (60-100%) middle and upper slopes. Elevation varies from 2100 ft. on the terraces to 4400 ft. on the ridge top. Most of the area is composed of steep slopes. The landscape is exemplary of Klamath Region low to mid-elevation topography.

Geologically the proposed area is similar to much of the central Klamath Region. Low-elevation forests are found on Mesozoic granitics, mainly of tonolite and diorite, covered by pre-Cretaceous metavolcanics which support upper slope and ridge vegetation. The area has unstable, colluvial

slopes, and evidence of gully erosion which may be traced to major floods. The soils for the most part are thin and rocky with some exposed rock on the upper slopes and ridges. Some of the southwest-facing slopes show lithosolic scree which supports meager vegetation.

The climate is also similar to much of the central Klamath Region. Precipitation totals for nearby Sawyers Bar Ranger Station show a mean annual value over the past six years of 50 inches. The precipitation pattern is typical of California's mediterranean climate. The majority of the precipitation falls from November to February with minimal summer rain. Mean daily temperatures at Sawyers Bar Ranger Station range from 37.5-40°F in the coldest months to 72-75°F during the warmest summer months. The precipitation totals and relatively moderate temperatures reflect a strong maritime influence which is found in the western and central Klamath Region.

The vegetation of the area is composed of old-growth *Pseudotsuga menziesii*-mixed evergreen forests on mesic terraces and slopes, while more xeric south and southwest-facing slopes and ridges support old-growth *Quercus chrysolepis*, *Pinus ponderosa*-dominated forests. Both forest types show mixed age structures with canopy species well represented in the sapling and seedling layers. The understory shrub and

herb layers vary according to the relative moisture relationships. Phases of the two types can be recognized. Mesic environments are rich in herbs and shrubs, while xeric sites support open herb and shrub layers. The *Pseudotsuga*-mixed hardwood forests occupy most, about 75% (450 acres), of the proposed research natural area.

Methods and Materials

A preliminary reconnaissance was made in May 1976, at which time an inventory of vascular plants was initiated. Only plants of unknown taxa were collected. These were identified at the Humboldt State University Herbarium (HSC). Voucher specimens are deposited there. From this reconnaissance two major vegetation types were proposed in the area, a *Pseudotsuga*-mixed hardwood forest and a *Quercus chrysolepis* forest. Within these types several phases seemed possible; sampling procedures were planned accordingly.

Determination of forest composition:

After a general reconnaissance, species composition of the canopy, understory, and ground layers were sampled using 32 relevés. In representative areas, species coverage was estimated using standard techniques (Mueller-Dombois and Ellenburg 1974). Association tables were then developed to determine compositional differences between vegetation types and their phases.

Stand analyses:

Five topographically defined subdivisions within the two vegetation types were sampled separately for tree (> 4" dbh) density and basal area. Due to slope steepness the point-centered quarter method (Mueller-Dombois and Ellenberg 1974) was employed. Distances were measured by range finder; tree diameters were taped. Within each category 20 to 25 points were taken along transects which contoured the slopes. Points were at 25 to 50 paced intervals depending on stand density.

Growth rates were calculated for *Pseudotsuga menziesii*, *Pinus lambertiana*, and *P. ponderosa*. Thirty vigorously growing canopy trees were cored, and rates (inches year^{-1}) were calculated from samples averaging 5 inches in length. The steepness of the slopes inhibited adequately measuring tree heights.

Relevés, sampling points for trees, and increment corings were done in July and August 1976. Additional late summer plants were collected at these times to complete field sampling.

Results

Some 198 taxa were recognized in the proposed natural area (Appendix I). The plants are typical of low and middle elevation Klamath Mountain flora. No rare or endangered species were encountered.

Forest composition:

The 32 relevés were assembled into a series of association tables to demonstrate compositional differences. The final presence table (Table 1) illustrates two major forests, the *Pseudotsuga menziesii/Adenocaulon bicolor* type, and the *Pinus ponderosa-Quercus chrysolepis* type. Within these types distinct phases were recognized. Within the *Pseudotsuga/Adenocaulon* type these phases probably reflect differences in available moisture. The more mesic sites on both terraces and slopes display an herb-rich *Pseudotsuga menziesii/Linnaea borealis* phase with several common associate species, *Trillium ovatum*, *Viola glabella*, *Smilacina racemosa*, *Lupinus latifolius*, and *Whipplea modesta*. This phase also has characteristic patches of *Chrysolepis chrysophylla* and *Taxus brevifolis* in it.

Typical of the relatively drier slopes is the *Pseudotsuga menziesii/Chimaphila menziesii* phase. Here *Pinus ponderosa* and *P. lambertiana* are common in a canopy dominated by *Pseudotsuga*. In the understory, *Arbutus menziesii* becomes more important than in the wetter phase. Many of the more mesophytic herbs are not found here, yet it is still relatively herb-rich. Although there are few characteristic herbs, many such as *Trientalis latifolia*, *Hieracium albiflorum*, *Disporum hookeri*, *Campanula prenanthoides*, *Adenocaulon bicolor*, and *Osmohiza chilensis* are common in both phases.

The second major forest, the *Pinus ponderosa-Quercus chrysolepis* type, occurs on the most xeric slopes. It characteristically has a more open canopy and herb-poor understory than do *Pseudotsuga/Adenocaulon* forests. This type also has two phases which may well reflect available moisture as a function of substrate differences. The first *Pinus ponderosa/Arctostaphylos manzanita* phase is found on mid and upper southwest-facing slopes with relatively well-developed soils. It is typically open, and shows a codominant canopy of *Pinus ponderosa*, *P. lambertiana*, and *Pseudotsuga*. The herb coverage is often less than 10% in mid-summer.

The second *Quercus chrysolepis/Polystichum imbricans* phase is found on the driest ridges and rock outcrops. Although *Q. chrysolepis* does not attain canopy status in the sense of *Pseudotsuga* or *Pinus*, it is by far the dominant species here. This phase is typical of rocky ridges and scree slopes where *Polystichum imbricans* and *Festuca* are common.

Stand analyses:

Data from the point-centered quarter method samples were used to calculate density and basal area (Table 2). Initially the *Pseudotsuga/Adenocaulon* type was divided into three topographic categories. The compositional phases of this

type do not directly correspond to these categories, although the low slopes and terraces generally would be considered to support *Pseudotsuga/Linnaea* forests. The low slope stands are the most dense and have the most basal area (271 trees acre^{-1} 708 ft.^{2} acre^{-1}). The terrace stands show the least density and basal area (188 trees acre^{-1} and 453 ft.^{2} acre^{-1}). Pines appear on steep slope stands where they are relative insignificant (less than 7 trees acre^{-1} and 50 ft.^{2} acre^{-1}). *Pseudotsuga* is by far the most dense and dominant species here.

In the *Pinus ponderosa-Quercus chrysolepis* type, data substantiate our observations of its open character. The *Pinus/Arctostaphylos* phase shows less basal area than the *Pseudotsuga* forests, but it is well above the *Quercus/Polystichum* phase. In the *Pinus/Arctostaphylos* phase most of the basal area is spread among *Pinus ponderosa* (71 ft.^{2} acre^{-1}), *Pseudotsuga* (45 ft.^{2} acre^{-1}), and *Pinus lambertiana* (34 ft.^{2} acre^{-1}). However on the most xeric sites of the *Quercus/Polystichum* phase these same species represent less than 25% of the total basal area (82 ft.^{2} acre^{-1}).

Productivity:

Productivity estimates were made by counting the number of annual rings inch^{-1} from core samples taken from selected vigorously growing canopy trees. Only *Pseudotsuga, Pinus*

ponderosa and *Pinus lambertiana* were sampled. It is apparent (Table 3) that mesic slope stands are the most productive while drier slopes are the least. Terrace stands are intermediate.

Summary

The vegetation of the proposed Specimen Creek Research Natural Area can be divided into two, each type having two phases. These recognized units are apparently correlated with soil moisture conditions. The most productive stands are on the relatively more moist slopes, and are dominated by *Pseudotsuga menziesii*. Pines only become important on the more xeric slopes where *Quercus chrysolepis* dominates.

Evaluation of the area

The area is typical of interior, mixed evergreen forests at low elevations in the central Klamath Mountains (Sawyer et al. 1977). Steep, unstable slopes are covered with Douglas-fir-dominated forests. Tan oak is missing and madrone is not as important as in areas more centrally located in the mixed evergreen forest. The steep slopes will reduce research value, due to the difficulty of access. Slope instability and gullying detract as well.

Proposed boundaries offer mostly west-facing slopes, a small terrace area, and ridge line. This limits utility over an area which would include several slope directions.

Expansion of the natural area to include east-facing, south-facing, and north-facing slopes would enhance research resources. There is a high quality road (40N42) system to near the ridge in the adjacent Kelly Gulch watershed. It provides better access to ridge locations than the trail along the Little North Fork. Expansion of the natural area down to or to include the clearcut blocks would include some productive stands on east-facing slopes. Expansion to include north and south-facing slopes is quite possible as well. Most of the adjacent south-facing stands are *Pinus ponderosa-Quercus chrysolepis* forests, and would increase their representation in the natural area.

Another detracting aspect to this area is the large amount of recently killed Douglas-fir. Insect damage is high in alluvial stands and in pockets on the slopes. The small terrace acreage is greatly affected. The little North Fork trail and cattle drives have introduced some weeds to low elevation stands. Mining activities in Specimen Creek do not directly affect the area except for trail use, although it should be emphasized that terrace stands are not remote from casual use. Instrument locations may not be feasible there.

A larger topographically varied research natural area as proposed here would be a valuable addition to California's

system. It is representative of northern, interior mixed evergreen forests dominated by Douglas-fir. Specimen Creek, though, is not representative of the more extensive kinds of mixed evergreen forests at low elevations in the Siskiyou Mountains, South Fork Mountain, or the North Coast Ranges. This cannot be expected to fill the needs for a highly productive Douglas-fir research natural area better represented in those localities.

Figure 1. Location of proposed Specimen Creek Natural Area, Sawyers Bar quadrangle, Siskiyou County, California. ____ Forest Service proposal, --- expanded natural area recommendation.

Table 2. Density (D as trees acre^{-1}) and basal area (BA as ft.^{2} acre^{-1}) for terrace, low slopes and steep slopes in *Pseudotsuga/Adenocaulon* forests and for both phases of the *Pinus-Quercus* forests.

Type	*Pseudotsuga/Adenocaulon*						*Pinus-Quercus*			
Subdivision or phase	Terrace		Low slope		Steep slope		*Arctostaphylos*		*Polystichum*	
Species	D	BA	D	BA	D	BA	D	BA	D	BA
Pseudotsuga menziesii	128	427.1	148	657.3	108	529.2	60	45.1	67	76.6
Pinus ponderosa	-	-	-	-	5	19.8	57	70.7	5	3.5
Pinus lambertiana	-	-	-	-	2	24.9	34	33.5	10	2.3
Quercus chrysolepis	2	0.3	3	0.7	21	8.3	57	29.6	394	267.6
Quercus kelloggii	4	0.6	22	9.0	21	5.8	52	15.1	29	6.5
Arbutus menziesii	11	13.1	8	19.3	23	13.2	-	-	19	16.2
Cornus nuttallii	4	0.5	8	0.7	5	0.7	-	-	-	-
Chrysolepis chrysophylla	24	6.5	63	15.9	39	16.0	-	-	-	-
Acer macrophyllum	-	-	10	2.3	7	3.6	-	-	-	-
Taxus brevifolia	15	4.6	10	2.8	-	-	-	-	-	-
Stands	188	452.8	271	708.1	230	621.5	259	194.1	479	372.7

Table 3. Average radial growth rates (years inch^{-1}) for selected canopy trees on terrace and steep slope *Pseudotsuga/Adenocaulon* forests and for *Pinus-Quercus* forests. Trees cored at breast height.

Category	Mean radial growth, years inch^{-1} (individual growth rates)
	Pseudotsuga menziesii/Adenocaulon bicolor
Terrace	
Pseudotsuga menziesii	24.9 (28.0, 13.4, 27.4, 30.4, 21.3, 32.5, 15.3, 32.8, 19.3, 28.2)
Steep slope	
Pseudotsuga menziesii	17.5 (10.8, 18.9, 20.2, 21.6, 15.8 15.8, 22.2, 18.8, 13.6)
Pinus lambertiana	9.1 (9.1)
	Pinus ponderosa-Quercus chrysolepis
Pinus lambertiana	20.7 (18.4, 16.6, 27.0)
Pinus ponderosa	25.7 (33.8, 21.8, 21.5)
Pseudotsuga menziesii	29.7 (17.3, 38.9, 37.8, 24.7)

Literature cited

Mueller-Dombois, D. and H. Ellenburgh. 1974. Aims and methods of vegetation ecology. Wiley, New York. 547 p.

Sawyer, J. O., D. A. Thornburgh and J. R. Griffin, 1977. Mixed evergreen forest. In: M. G. Barbour and J. Major (eds.) Terrestrial vegetation of California. Wiley, New York.

Tom Taylor Cabin
Dry Lake
Little
Right Hand Fork
Left Hand Fork
WILDERNESS AREA
BOUNDARY
Devils Canyon
Cherry Creek
North Fork
Crapo Mtn
Tatmouse Cr
Wacker Ridge
Mud Lake
Garden Gulch
Meadows
Little North Fk Campground
Ahlgren Ranch
Kelly
Jackass Gulch
Nylon Gulch
Tanners Peak
Sawyers Bar
Salmon
Bestville
Red Bank Campground
Burns Ranch
Spring
RIDGE
BLUE
Lookout
Black Bear Summit
Godfrey Ranch
Indian Creek
Jessups
Edgy Gulch
Humpback Ridge
Wilson Mine
Rollin Site
Morning Star Mine
Evening Star Mine
Big Fish Mine
Saturn Mine
Laurel Mine
Hidden Treasure Mine
Sagebrush Mine
Flapjack Bar
Jodee Mine
Mallory Mine
Gallia Mine
Red Hill Mine
Hickory Mine
Black Bear Mine
Hidden Treasure Gulch
Tanner Gulch
Jackass Gulch
Kelly Gulch
Nylon Gulch
Garden Gulch
Wacker Ridge
Devils Canyon
Cherry Creek
North Fork
Left Hand Fork
Right Hand Fork
Little Fork
Big Fork
Little Creek
Big Creek
Tatmouse Cr
Crapo Mtn

Appendix I. Taxa recognized within the proposed Specimen Creek Natural Area. Collected plants were identified using the facilities of the Humboldt State University Herbarium (HSC). Vouchers are deposited there. Nomenclature follows P. Munz. 1959. A California flora. University of California Press, Berkeley. 1581 p.

Aceraceae

Acer macrophyllum
Acer glabrum var. *torreyi*

Amaryllidaceae

Brodiaea multiflora
Brodiaea elegans

Anacardiaceae

Rhus diversiloba

Apocynaceae

Apocynum pumilum

Arailiaceae

Aralia californica

Aristolochiaceae

Asarum hartwegii

Asclepiadaceae

Asclepias cordifolia

Aspidiaceae

Athyrium filix-femina
Polystichum imbricans
Polystichum minutum

Berberidaceae

Achlys triphylla
Berberis aquifolium
Berberis nervosa
Berberis pinnata
Vancouveria planipetala

Betulaceae

Alnus rhombifolia
Corylus cornuta var. *californica*

Blechnaceae

Woodwordia fimbriata

Campanulaceae

Campanula prenanthoides

Caprifoliaceae

Linnaea borealis ssp. *longiflora*
Lonicera ciliosa
Lonicera hispidula
Symphoricarpus hesperius
Symphoricarpus mollis

Caryophyllaceae

Arenaria douglasii
Arenaria macrophylla
Silene companulata
Silene sp.

Celastraceae

Euonymus occidentalis
Paxistima myrsinites

Compositae

Adenocaulon bicolor
Antennaria argentea
Arnica discoidea
Balsamorhiza deltoidea
Crepis acuminata
Erigeron foliosus var. *confinis*
Eriophyllum lanatum
Gnaphalium microcephalum
Hieracium albiflorum
Hieracium greenei
Madia exigera
Madia madioides
Stephanomeria virgata
Tragopogon porrifolius

ble 1. Presence (P%) and modal cover/abundance (C/A) for all sampled trees d shrubs, and for herbs with > 20% presence. *Pseudotsuga/Linnaea* sampled th 7 relevés, *Pseudotsuga/Chimaphila* with 9, *Pinus/Arctostaphylos* with 8, d *Quercus/Polystichum* with 8. Cover/abundance scale: 1= one individual, rare and < 10%, 3= common and < 10%, 4= 10-25%, 5= 25-50%, 6= 50-75%, > 75%. Applicable subspecific nomenclature in Appendix I.

ype	*Pseudotsuga/Adenocaulon*				*Pinus-Quercus*			
hase	*Linnaea*		*Chimaphila*		*Arctostaphylos*		*Polystichum*	
rees, upper canopy	P%	C/A	P%	C/A	P%	C/A	P%	C/A
eudotsuga menziesii	100	5	100	6	100	3	100	3
inus lambertiana	-	-	66	3	75	3	50	3
inus ponderosa	-	-	33	3	100	4	75	3
inus attenuata	-	-	-	-	-	-	12	4
nderstory, or lower canopy								
alocedrus decurrens	14	4	-	-	-	-	-	-
axus brevifolia	43	3	-	-	-	-	-	-
hrysolepis chrysophylla	43	4	55	3	-	-	-	-
cer macrophyllum	71	3	44	3	-	-	-	-
ornus nuttallii	71	3	100	3	13	3	-	-
bies concolor	-	-	33	1	-	-	-	-
eudotsuga menziesii	100	4	100	4	100	4	87	4
inus lambertiana	14	1	33	2	63	4	87	2
inus ponderosa	-	-	-	-	63	3	25	3
butus menziesii	-	-	77	2	75	4	75	2
ercus kelloggii	57	2	44	3	75	3	37	2
ercus chrysolepis	43	2	88	4	100	4	100	6
eedlings								
alocedrus decurrens	14	1	11	1	-	-	-	-
axus brevifolia	71	2	-	-	-	-	-	-
hrysolepis chrysophylla	71	2	44	2	-	-	-	-
cer macrophyllum	14	2	37	2	-	-	-	-
ornus nuttallii	71	3	77	2	13	1	-	-
bies concolor	28	1	11	2	-	-	-	-
eudotsuga menziesii	100	3	88	2	63	2	87	2
inus lambertiana	14	1	66	2	75	2	87	2
inus ponderosa	-	-	-	-	37	2	37	2
butus menziesii	28	1	22	1	37	2	25	2
ercus kelloggii	14	1	11	2	63	2	13	2
ercus chrysolopis	71	2	100	3	87	3	100	3
hrubs								
nomymus occidentalis	14	2	-	-	-	-	-	-
ultheria shallon	14	4	-	-	-	-	-	-
ornus sessile	14	3	-	-	-	-	-	-
rberis aquifolium	14	3	-	-	-	-	-	-
amnus californica	-	-	22	2	-	-	-	-
rberis nervosa	100	3	33	3	-	-	-	-
axistema myrsinites	43	2	22	1	-	-	-	-
bus vitifolius	14	3	22	3	-	-	-	-
elanchier pallida	28	2	22	1	-	-	-	-
bus parviflorus	43	2	22	3	-	-	-	-
phoricarpos spp.	56	2	77	2	-	-	-	-
bes roezlii	-	-	11	2	-	-	-	-
bes sanguineum	-	-	11	3	-	-	-	-
orylus cornuta	86	4	88	3	13	1	-	-
Philadelphus lewisii	43	2	11	4	13	1	-	-
osa gymnocarpa	71	2	66	2	25	2	-	-
eanothus intergerrimus	28	2	22	2	50	3	-	-
Quercus garryana	-	-	11	2	-	-	13	3
Rhus diversiloba	86	2	77	4	75	2	63	3
Arctostaphylos manzanita	-	-	-	-	37	4	25	2
Herbs								
innaea borealis	100	4	-	-	-	-	-	-
rillium ovatum	71	2	-	-	-	-	-	-
Clintonia uniflora	43	3	-	-	-	-	-	-
Viola sempervirens	57	2	-	-	-	-	-	-
Whipplea modesta	57	4	-	-	-	-	-	-
Satureja douglasii	43	3	-	-	-	-	-	-
Smilacina racemosa	43	2	22	2	-	-	-	-
Viola glabella	71	3	22	2	-	-	-	-
Heuchera micrantha	27	3	11	1	-	-	-	-
Lupinus latifolius	86	3	33	3	-	-	-	-
Lathyrus polyphyllus	57	2	11	4	-	-	-	-
Polystichum munitum	14	3	33	3	-	-	-	-
Goodyera oblongifolia	43	2	33	1	-	-	-	-
Asarum hartwegii	14	1	33	1	-	-	-	-
Adenocaulon bicolor	86	3	44	3	-	-	-	-
Bromus spp.	14	3	33	3	-	-	-	-
Fragaria californica	57	2	22	2	-	-	-	-
Chimaphila menziesii	-	-	33	2	-	-	-	-
Osmorhiza chilensis	86	3	44	2	-	-	-	-
Disporum hookeri	86	3	66	3	-	-	-	-
Trientalis latifolia	86	3	77	2	-	-	-	-
Galium triflorum	100	3	33	2	-	-	-	-
Chimaphila umbellata	86	3	33	3	-	-	-	-
Vancouveria planipetala	86	2	44	2	-	-	-	-
Melica spp.	86	3	22	3	-	-	-	-
Pyrola picta	43	2	66	2	13	2	-	-
uzula comosa	28	2	33	1	13	2	-	-
Iris purdyi	57	2	44	2	50	2	-	-
Lonicera hespidula	57	2	44	2	13	2	25	2
Vicia californica	71	3	44	2	13	2	-	-
Apocynum pumilum	57	2	33	2	25	2	37	2
Madia madiodes	57	2	22	2	37	2	-	-
Pteridium aquilinum	71	2	66	2	25	2	13	2
Campanula prenanthoides	57	3	75	3	25	2	-	-
Heiracium albiflorum	86	2	66	3	75	3	25	1
Arnica discoides	28	3	55	3	25	2	-	-
Microsteris gracilis	28	2	11	2	13	2	-	-
Arenaria macrophylla	43	2	33	2	25	2	13	2
Galium californicum	14	2	33	2	75	2	50	2
Lotus spp.	-	-	-	-	37	2	-	-
Carex sp.	-	-	-	-	50	2	-	-
Polystichum imbricans			11	3	50	2	87	3
Festuca idahoensis					25	3	50	2

onvolvulaceae

Convolvulus polymorphus

ornaceae

Cornus nuttallii
Cornus sessilis
Cornus stolonifera

rassulaceae

Sedum laxum
Sedum purdyi

ruciferae

Arabis modesta
Arabis purberula
Dentaria californica
Streptanthus tortuosus

upressaceae

Calocedrus decurrens

Cyperaceae

Carex sp.

Equisetaceae

Equisetum funstoni

Ericaceae

Arbutus menziesii
Arctostaphylos manzanita
Arctostaphylos patula
Gaultheria shallon

Fabaceae

Laythrys polyphyllus
Laythrys sulphureus
Lotus nevadensis
Lotus oblongifolius var. *nevadensis*
Lotus subpinnatus
Lupinus bicolor
Lupinus latifolius var. *latifolius*
Trifolium howellii
Trifolium incarnatum
Vicia californica

Fagaceae

Chrysolepis chrysophylla
Quercus chrysolepis
Quercus chrysolepis var. *nana*
Quercus garryana
Quercus garryana var. *breweri*
Quercus kelloggii
Quercus vacinifolia

Fumariaceae

Dicentra formosa

Garryaceae

Garrya fremontii

Hydrophyllaceae

Nemophila menziesii
Phacelia hasta

Iridaceae

Iris purdyi
Sisyrinchium bellum

Juncaceae

Juncus sp.
Luzula comosa

Labiatae

Monardella odoratissima
Satureja douglasii
Stachys rigida

Liliaceae

Calochortus tolmiei
Clintonia uniflora
Disporum hookeri var. *trachyandrum*
Lilium kelleyanum
Lilium washingtonianum var. *washingtonianum*
Smilacina racemosa
Smilacina stellata
Smilax californica
Trillium ovatum

Onagraceae

Circaea alpina var. *pacifica*
Clarkia rhomboidea
Epilobium glaberrimum
Epilobium paniculatum

Orchidaceae

Calypso bulbosa
Corallorhiza maculata
Eburophyton austinae
Goodyera oblongifolia
Piperia unalascensis

Orobanchaceae

Boschniakia strobilacea

Pinaceae

Abies concolor
Pinus attenuata
Pinus lambertiana
Pinus ponderosa
Pseudotsuga menziesii

Poaceae

Aira praecox
Agropyron repens
Bromus mollis
Bromus orcuttianus
Deschampsia elongata
Festuca californica
Festuca idahoensis
Festuca occidentalis
Glyceria pauciflora
Melica harfordii
Melica subulata
Poa nervosa
Poa pratensis
Stipa lemmonii
Vulpia microstachys

Polemoniaceae

Allophyllum gilioides
Gilia capitata
Microsteris gracilis

Polygonaceae

Eriogonum nudum

Portulacaceae

Lewisia cotyledon
Montia perfoliata
Montia spathulata

Primulaceae

Trientalis latifolia

Pteridaceae

Cheilanthes gracillima
Pteridium aguilinum var. *lanuginosum*

Pyrolaceae

Chimaphila menziesii
Chimaphila umbellata var. *occidentalis*
Monotropa hypopithys
Pterospora andromedea
Pyrola picta
Pyrola picta forma *aphylla*
Pyrola picta ssp *dentata*

Rhamnaceae

Ceanothus integerrimus var. *californicus*
Rhamnus californica
Rhamnus rubra var. *rubra*

Rosaceae

Amelanchier pallida
Fragaria californica
Holodiscus discolor
Osmaronia cerasiformis
Potentilla glandulosa
Rosa gymnocarpa
Rubus parviflorus
Rubus ursinus
Rubus vitifolius

Rubiaceae

Galium californicum
Galium triflorum

Saxifragraceae

Heuchera micrantha var. *erubescens*
Mitella sp.
Peltiphyllum peltatum
Philadelphus lewisii ssp. *californicus*
Ribes lobbii
Ribes roezlii
Ribes sanguineum var. *sanguineum*
Tellima grandiflora
Tolmiea menziesii
Whipplea modesta

Scrophulariaceae

Castilleja affinis
Castilleja applegatei
Collinsia linearis
Cordylanthus viscidus
Mimulus moschatus
Pedicularis racemosa
Penstemon deustus
Penstemon purpusii

Solanaceae

Solanum parishii

Taxaceae

Taxus brevifolia

Umbelliferae

Daucus carota
Ligusticum californicum
Lomatium californicum
Lomatium dasycarpum
Osmorhiza chilensis
Sanicula graveolens

Violaceae

Viola glabella
Viola sempervirens

Figure 2. Slopes of proposed Specimen Creek Research Natural Area. The major tree in these *Pseudotsuga menziesii/Adenocaulon bicolor* forests is Douglas-fir.

Figure 3. Insect damage to *Pseudotsuga menziesii* in terrace stands of *Pseudotsuga menziesii/ Adenocaulon bicolor* forests along the Little North Fork of the Salmon River.

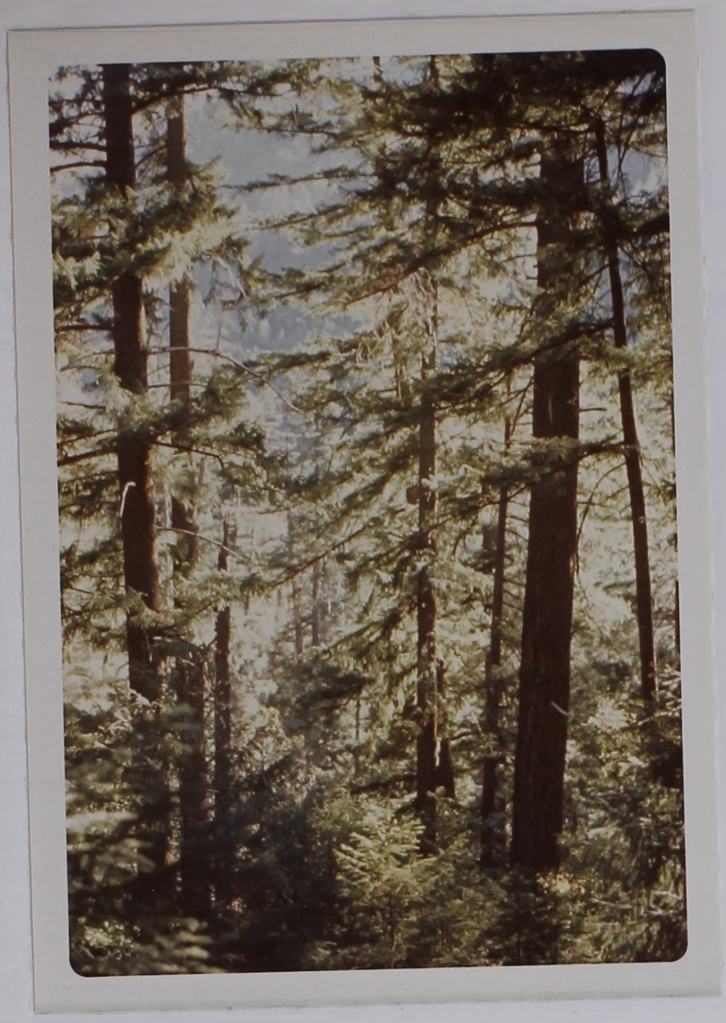

Figure 4. Steep, west-facing slope *Pseudotsuga menziesii/chimaphila menziesii* phase forests of the *Pseudotsuga menziesii/Adenocaulon bicolor* type.

Figure 5. *Quercus chrysolepis* on south-facing scree slopes typical of the driest *Quercus chrysolepis/Polystichum imbricans* phase of the *Pinus ponderosa-Quercus chrysolepis* forests.